CLAIMS

1. A planar lightwave circuit type variable optical attenuator having waveguides formed on a substrate, said variable optical attenuator comprising:

an input waveguide;

a first optical coupler;

a second optical coupler;

two arm waveguides connecting said first optical coupler to said second optical coupler; and

an output waveguide, wherein

each of said first optical coupler and said second optical coupler is a directional coupler having a region in which said two arm waveguides are brought in close proximity to each other; and

a polarization mode coupling in said first optical coupler and said second optical coupler is equal to or less than -25 dB.

2. The planar lightwave circuit type variable optical attenuator as claimed in claim 1, wherein an absolute value of a waveguide birefringence at optical coupler sections constituting said first optical coupler and said second optical coupler is equal to or greater than 3.5×10^{-4}.

3. The planar lightwave circuit type variable optical attenuator as claimed in claim 1 or 2, wherein

said first optical coupler and said second optical coupler are a directional coupler constructed by bringing said two arm waveguides in close proximity to each other.

4. The planar lightwave circuit type variable optical attenuator as claimed in any one of claims 1-3, wherein

a length of said arm waveguides is designed to be equal to an integer multiple of an optical beat length obtained by dividing a used optical wavelength by the waveguide birefringence.

5. The planar lightwave circuit type variable optical attenuator as claimed in any one of claims 1-4, wherein

at least one of said two arm waveguides has a phase controller; and

said variable optical attenuator functions as a variable optical attenuator or optical switch.

6. The planar lightwave circuit type variable optical attenuator as claimed in any one of claims 1-5, wherein

said substrate is a silicon substrate, and said waveguides are silica-based glass waveguides.